

Appl. No. 09/685,196  
 Amendment dated January 25, 2005  
 Reply to Office Action of April 23, 2005

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of the claims in the application:

1. (Currently Amended) A method for identifying a phase of an incoming ultrawide bandwidth (UWB) signal at a UWB receiver, comprising the steps of:
  - receiving incoming pulses of the incoming UWB signal, adjacent pulses of said incoming pulses arriving at a predetermined interval;
  - generating first local pulses at a first detecting arm in the UWB receiver;
  - generating second local pulses at a second detecting arm in the UWB receiver;
  - correlating the first and second local pulses with the incoming pulses to produce a first and second correlation function functions, respectively;
  - selecting one of the first and second detecting arms to identify the phase based on the first and second correlation function functions, and to demodulate data from the incoming UWB signal;
  - and
  - selecting another of the first and second detecting arms to vary its operational phase and continue to correlate first or second local pulses with the incoming pulses to refine the phase.
2. (Original) A method of claim 1, wherein the predetermined interval is the time between the incoming pulses.
3. (Original) A method of claim 1, wherein the incoming pulses are at least one of bi-phase modulated, and quadrature phase modulated.



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4. (Original) A method of claim 3, wherein the incoming pulses are multilevel pulses.

5. (Currently Amended) A method of claim 1, wherein the step of correlating the first and second local pulses with the incoming pulses to produce a the correlation function comprises:

shifting a first phase of the first local pulses;

shifting a second phase of the second local pulses;

calculating a first correlation value of the first local pulses and the incoming pulses; and

calculating a second correlation value of the second local pulses and the incoming pulses,

wherein the first correlation value is greater than the second correlation value.

6. (Previously Presented) A method of claim 5, wherein the correlation function comprises the first and second correlation values.

7. (Cancelled)

8. (Currently Amended) A method of claim 1,

wherein the selecting of one of the first and second detecting arms further comprises:

determining when the first correlation value, corresponding to a first detecting arm,  
exceeds a predetermined threshold;

determining when the second correlation value, corresponding to a second  
detecting arm, exceeds the predetermined threshold;

comparing the first correlation value to the second correlation value;



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selecting the first detecting arm to identify the phase if the first correlation value is greater than the second correlation value; and

selecting the first detecting arm to identify the phase if the first correlation value is greater than the second correlation value, and

wherein the predetermined threshold is based on a desired bit error rate of the incoming UWB signal.

9. (Currently Amended) A system for identifying a phase of an incoming ultrawide bandwidth (UWB) signal at a UWB receiver, comprising:

an antenna configured to receive incoming pulses of the incoming UWB signal, adjacent pulses of said incoming pulses occurring at a predetermined interval;

a first signal generator configured to generate first local pulses;

a second signal generator configured to generate second local pulses;

a first correlator configured to correlate the incoming pulses with the first local pulses to produce ~~as~~ a first correlation function, and configured to demodulate data from the incoming UWB signal;

a second correlator configured to correlate the incoming pulses with the second local pulses to produce a second correlation function, and configured to demodulate data from the incoming UWB signal; and

a selector configured to select one of the first and second correlators to identify the phase based on the first and second correlation functions and to demodulate data from the incoming UWB signal, and to select another of the first and second correlators to perform a phase refining function.



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10. (Original) A system of claim 9, wherein the predetermined interval is a distance between the incoming pulses in time.

11. (Original) A system of claim 9, wherein the incoming pulses are at least one of bi-phase modulated, and quadrature phase modulated.

12. (Original) A system of claim 11, wherein the incoming pulses are multilevel pulses.

13. (Previously Presented) A system of claim 9, wherein the first correlator comprises:  
a phase adjuster configured to adjust a phase of the first local pulses; and  
a calculator configured to calculate a first correlation value of the first local pulses and the incoming pulses.

14. (Previously Presented) A system of claim 13, wherein the first correlation function comprises a plurality of first correlation values.

15. (Currently Amended) A system of claim 9,  
wherein the first correlator is in a first detecting arm,  
wherein the second correlator is in a second detecting arm, and  
wherein the selector comprises:



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a calculator configured to find a when the first correlation value for a first detecting arm that exceeds a predetermined threshold and a when the second correlation value for a second detecting arm that exceeds the predetermined threshold; and

a comparator configured to compare the first correlation value to the second correlation value to select the detecting arm with a higher correlation value the first detecting arm when the first correlation value is greater than the second correlation value, and to select the second detecting arm when the second correlation value is greater than the first correlation value.

16. (Original) A system of claim 15, wherein the predetermined threshold is based on a desired bit error rate of the incoming UWB signal.

17. (Currently Amended) A system for identifying a phase of an incoming ultrawide bandwidth (UWB) signal at a UWB receiver, comprising:

means for receiving incoming pulses of the incoming UWB signal, adjacent pulses of said incoming pulses arriving at a predetermined interval;

means for generating first local pulses at the UWB receiver;

means for correlating the first local pulses with the incoming pulses to produce a first correlation function, and for demodulating data from the incoming UWB signal;

means for generating second local pulses at the UWB receiver;

means for correlating the second local pulses with the incoming pulses to produce a second correlation function, and for demodulating the data from the incoming UWB signal; and

means for selecting one of the first and second detecting arms to identify the phase and demodulate the data from the incoming UWB signal based on the first and second correlation



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functions, and for selecting another of the first and second detecting arms to continue to produce either a first or second correlation function.

18. (Currently Amended) A method for identifying a phase of an incoming ultrawide bandwidth (UWB) signal at a UWB receiver, comprising the steps of:

receiving incoming pulses of the incoming UWB signal, adjacent pulses of said incoming pulses arriving at a predetermined interval;

generating local pulses at the UWB receiver;

correlating the local pulses with the incoming pulses to produce a correlation function; and

selecting one of first and second a detecting arms arm to identify the phase based on the correlation function,

wherein the step of selecting one of the first and second a detecting arms arm to identify the phase based on the correlation function comprises:

finding a first correlation value for a first detecting arm that exceeds a predetermined threshold;

decreasing the predetermined threshold until the first correlation value is found;

finding a second correlation value for a second detecting arm that exceeds the predetermined threshold, after decreasing the predetermined threshold; and

comparing the first correlation value to the second correlation value to select the ~~detecting arm with a higher correlation value~~ the first detecting arm when the first correlation value is greater than the second correlation value, and to select the second detecting arm when the second correlation value is greater than the first correlation value.



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19. (Original) A method of claim 18, wherein the predetermined threshold is based on a desired bit error rate of the incoming UWB signal.

20. (Currently Amended) A method of claim 1, wherein the step of selecting one of the first and second detecting arms comprises:

finding a first correlation value for a the first detecting arm that exceeds a predetermined threshold;

determining a first phase corresponding to the first correlation value;

finding a second correlation value for a the second detecting arm that exceeds the predetermined threshold over a phase range beginning with the first phase; and

comparing the first correlation value to the second correlation value to select ~~the detecting arm with a higher correlation value~~ the first detecting arm when the first correlation value is greater than the second correlation value, and to select the second detecting arm when the second correlation value is greater than the first correlation value.

21. (Cancelled)

22. (Currently Amended) A system for identifying a phase of an incoming ultrawide bandwidth (UWB) signal at a UWB receiver, comprising:

an antenna configured to receive incoming pulses of the UWB signal, adjacent pulses of said incoming pulses occurring at a predetermined interval;

a signal generator configured to generate local pulses;



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a correlator configured to correlate the incoming pulses with the local pulses to produce an at least two correlation function functions; and

a selector configured to select one of first and second a detecting ~~arms~~ arm to identify the phase based on the at least two correlation function functions,

wherein the selector comprises:

a calculator configured to find a first correlation value selected from the at least two correlation functions for a the first detecting arm that exceeds a predetermined threshold and a second correlation value selected from the at least two correlation functions for a the second detecting arm that exceeds the predetermined threshold;

a subtractor configured to decrease the predetermined threshold until the first correlation value is found; and

a comparator configured to compare the first correlation value to the second correlation value to select the detecting arm with a higher correlation value the first detecting arm when the first correlation value is greater than the second correlation value, and to select the second detecting arm when the second correlation value is greater than the first correlation value.

23. (Original) A system of claim 22, wherein the predetermined threshold is based on a desired bit error rate of the incoming UWB signal.

24. (Currently Amended) A system of claim 9,

wherein the first correlator is in a first detecting arm,

wherein the second correlator is in a second detecting arm, and

wherein the selector comprises:



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a calculator configured to find a when the first correlation value for a first detecting arm that exceeds a predetermined threshold and a when the second correlation value for a second detecting arm that exceeds the predetermined threshold over a phase range beginning with a first phase;

a detector configured to determine the first phase corresponding to the first correlation value; and

a comparator configured to compare the first correlation value to the second correlation value to select the detecting arm with a higher correlation value the first detecting arm when the first correlation value is greater than the second correlation value, and to select the second detecting arm when the second correlation value is greater than the first correlation value.

25. (Original) A system of claim 24, wherein the predetermined threshold is based on a desired bit error rate of the incoming UWB signal.

26. (Currently Amended) A method for processing an incoming ultrawide bandwidth (UWB) signal at a UWB receiver, comprising the steps of:

- receiving incoming pulses of the incoming UWB signal;
- generating first local pulses at the UWB receiver at a first phase in a first detecting arm;
- correlating the first local pulses with the incoming pulses in the first detecting arm to produce a first correlation function;
- comparing the first correlation function with a predetermined threshold;



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tracking the phase of the incoming signal and demodulating data from the incoming UWB signal with the first detecting arm using the first phase, if the first correlation function is greater than the predetermined threshold;

generating second local pulses at the UWB receiver at a second phase different from the first phase in a second detecting arm, after comparing the first correlation function with the predetermined threshold;

correlating the second local pulses with the incoming pulses to produce a second correlation function;

comparing the first correlation function with the second correlation function; and

tracking the phase of the incoming signal and demodulating the data from the incoming UWB signal with the second detecting arm using the second phase if the second correlation function is greater than the first correlation function.

27. (Currently Amended) A method of claim 26, further comprising incrementing the second phase by a phase increment and repeating the steps of tracking the phase of the incoming signal with the first detecting arm, generating second local pulses at the UWB receiver at a the second phase, correlating the second local pulses, and comparing the first correlation function with the second correlation function, if the second correlation function is not greater than the first correlation function.

28. (Previously Presented) A method of claim 26, wherein when the second correlation function is greater than the first correlation function, the method further comprises:

varying the first phase to a new first phase; and



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generating new first local pulses at the UWB receiver at the new first phase in the first detecting arm;

correlating the new first local pulses with the incoming pulses to produce a new first correlation function;

comparing the new first correlation function with the second correlation function, wherein the new first phase is different from the second phase.

29. (Currently Amended) A system for processing an incoming ultrawide bandwidth (UWB) signal at a UWB receiver, comprising:

an antenna configured to receive incoming pulses of the incoming UWB signal;

a first detecting arm including:

a first signal generator configured to generate first local pulses, and

a first tracking correlator configured to correlate the incoming pulses with the first local pulses to produce a first correlation function, and configured to demodulate data from the incoming UWB signal;

a second detecting arm including:

a second signal generator configured to generate second local pulses;

a second tracing correlator configured to correlate the incoming pulses with the second local pulses to produce a second correlation function, and configured to demodulate the data from the incoming UWB signal; and

a selector configured to select one of the first and second detecting arms to identify a phase of the incoming UWB signal based on the first and second correlation functions and to demodulate



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the data from the incoming UWB signal, and configured to select another of the first and second detecting arms to continue to produce either a first or second correlation function.

30. (Previously Presented) A method of claim 5, wherein the correlation function is determined based on the first and second correlation values.